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The role of impulsivity, social relations online and offline and compulsive Internet use in cyberaggression: A four-country study

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Abstract

Cyberaggression is a harmful behavior, but cross-national studies on cyberaggression including relations among its individual and social predictors are limited. This study aimed to discover the direct and indirect relations among individual and social predictors of cyberaggression in a socio-demographically balanced survey data of 4,816 15 – 25-year-old participants from Finland ($n = 1,200$, 50.0% female), South Korea ($n = 1,192$, 50.34% female), Spain ($n = 1,212$, 48.76% female), and the United States ($n = 1,212$, 50.17% female). Both impulsivity and involvement in online cliques (i.e., identity bubbles) were related to more cyberaggression in the four countries. The relation between impulsivity and cyberaggression was partially mediated by compulsive Internet use in Finland, Spain and the United States, but not in South Korea. The relation between identity bubble involvement and cyberaggression was mediated via compulsive Internet use only in the Spanish sample. Findings of this study can be used for policy and practice against cyberaggression.

Keywords: Cyberaggression, Identity bubble involvement, Impulsivity, Cross-national study

1. Introduction

Aggressive behavior in young people has been extensively studied throughout the last decades. The rapid development and propagation of technologies have created a new context for interpersonal interactions that are now frequently carried out both in face-to-face situations and in cyberspace (Garcia et al., 2017; Tomczyk and Solecki, 2019). The ways in which aggressive behaviors in young people are expressed and perceived have evolved together with the development of electronic devices. Cyberspace provides therefore a new context for prosocial and antisocial behaviors and interactions (Smahel et al., 2020, Oksanen et al., 2021).

Even though research about aggression in young people has been fruitful, there are still many gaps in knowledge that need to be addressed. Not all the research areas focused on aggression online have been equally fruitful, with many studies focused on cyberbullying which is a specific type of cyberaggression and less studies focused on other forms of cyberaggression (Corcoran et al., 2015; Smith, 2012). Cyberbullying is usually defined as bullying perpetrated through electronic devices, it is usually studied in schools, and there is a strong overlap between bullying and cyberbullying (Nasaescu et al., 2020; Zych et al., 2015). Thus, cyberbullying is a form of bullying that is repeatedly perpetrated online, on a long-term basis, on a victim who cannot defend him- or herself easily (Smith et al., 2008). Although the number of studies about cyberbullying is increasing exponentially (Smith and Berkkun, 2017), the number of studies focused on cyberaggression from a broad perspective, which is not necessarily related to the school context, is limited. Moreover, dynamic predictors of cyberaggression including social and personal variables still need to be discovered.

This study aims to contribute to the lack of research and focuses on cyberaggression from a broad perspective. Cyberaggression includes cyberbullying, together with other aggressive behaviors online that do not need to be repeated, perpetrated on a long-term basis or with an imbalance of power. Thus, cyberaggression can take different forms including cyberbullying (Zych et al., 2015), cyberhate (i.e., expressions of hate related to intolerance including xenophobia, racism, discrimination, etc.; see

Banks, 2011), cybergossip (Romera et al. 2018), and different forms of cybercrime (e.g., cyberstalking, sexual and violent threats; see Mikkola et al., 2020), among others. Cyberaggression can be both brief and long-term, but a study conducted by France (Danesh and Jirard, 2013) found that brief forms are less common. Aggressive behaviors online have harmful consequences for individuals and societies, such as depression, suicidal thoughts, and behaviors (Kowalski et al., 2014), low subjective wellbeing (Keipi et al., 2018) and new forms of crime victimization (Yar and Steinmetz, 2019).

Cyberaggression is present in different age-groups (Kowalski et al., 2019). Nevertheless, young people between 15 and 25 years old can be especially vulnerable as they are the age group with the highest frequency of use of social networking sites and many other online services (Eurostat, 2018). Although more research regarding the relations between the consequences of cyberaggression and age is needed, several meta-analyses pointed out that cyberaggression is related to internalizing and externalizing problems in different age groups (Chen et al., 2017; Fisher et al., 2016). While risk and protective factors are mostly studied in adolescents (Kowalski et al., 2019), more research focused on risk and protective factors for cyberaggression in young adults is urgently needed. Young adults are an understudied group, but their Internet use is high. Thus, discovering risk and protective factors could be especially useful because new tailored interventions could be designed to decrease these risks and increase protective factors. Moreover, cross-national studies including large samples that examined dynamic relations among individual and social predictors are limited.

Our study defines cyberaggression as online communication that offends or threatens other users. Aggressive communication is one of the easiest and the most prevalent forms of cyberaggression (Twardowska–Staszek et al., 2018). The objective of our study was to discover the direct and indirect relations among individual and social predictors of cyberaggression in a cross-national comparative study conducted with a broad sample of young adults from Finland, South Korea, Spain and the US. Positive relations between high impulsivity, compulsive Internet use and

identity bubble involvement with cyberaggression, and a negative relation between high offline belonging and cyberaggression, were tested. We also explored if compulsive Internet use mediated the relation between impulsivity and cyberaggression, and the relation between identity bubble involvement and cyberaggression.

1.1. Impulsivity and compulsive Internet use as individual risk factors

A long research tradition has focused on the relation between impulsivity and aggressive behavior. Impulsivity is defined as preference for immediate rewards, difficulties in delaying gratification, and risky behaviors that are rarely planned and usually result in undesirable outcomes (Arce and Santisteban, 2006). It is now well established that high impulsivity is a robust risk factor for violence and offending. In the Cambridge Study in Delinquent Development, Farrington, Ttofi, Cargo, and Coid (2015) analyzed early risk factors in childhood as predictors of offending in two generations of London males including the original sample studied from age 8 up to age 56, and their sons. They found that high impulsivity was an independent predictor of offending in both generations. A study that compared male participants in the Cambridge Study in Delinquent Development and male participants of another longitudinal project, the Pittsburgh Youth Study, found that high impulsivity was a predictor of convictions several years afterwards based on criminal records in both settings (Farrington and Loeber, 1999). According to Gottfredson and Hirschi's (1990) general theory of crime, low self-control is related to high offending because individuals act impulsively finding it difficult to see the consequences of their behaviors. Many research studies confirmed the relation between low self-control and problem behavior (Pratt and Cullen, 2020; Vazsonyi et al., 2017). Low self-control is usually used as a proxy of high impulsivity (De Ridder & Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2018).

Although high impulsivity is a known risk factor for face-to-face aggressive behaviors, the relation between impulsivity and cyberaggression still needs to be thoroughly studied. A meta-analysis conducted by Guo (2016), based on five primary studies, found that antisocial personality that included hostility, narcissism, anxiety, and impulsivity was related to cyberbullying perpetration. A study conducted by Donner, Marcum, Jennings, Higgins and Banfield (2014) with 488 university students in the US found that low self-control was related to different types of cybercrime, including posting harmful information about someone online. Thus, previous studies showed that high impulsivity is related to certain problem behaviors online, but more research is needed to confirm if impulsivity is related to broadly understood cyberaggression. It is also important to discover dynamic relations that include impulsivity and other variables related to cyberaggression.

Impulsivity can be expressed in different contexts including impulsive cyberbehavior. In the online context, impulsivity is related to problematic use of the Internet (de Vries et al., 2018; Hong et al., 2014; Meerkerk et al., 2010). Problematic Internet use, often called compulsive Internet use, was defined by Caplan (2010) as an undercontrolled and continued use of the Internet regardless of its negative consequences and preoccupation with the Internet use. Those individuals who use the Internet compulsively are also more likely to behave aggressively online. Impulsive problematic Internet use was an independent predictor of cyberbullying perpetration found in Greek adolescents (Floros et al., 2013). A systematic review of meta-analyses found that low technology use was the strongest protective factor against cyberperpetration (Zych et al., 2019b). Gámez-Guadix, Borrajo and Almendros (2016) found that problematic Internet use predicted cyberbullying perpetration six months later among Spanish adolescents. These findings suggest that compulsive Internet use can be an individual risk factor for cyberaggression. Moreover, compulsive Internet use may mediate the relation between impulsivity and cyberaggression. More research is needed to discover these dynamic relations among impulsivity, compulsive Internet use, and cyberaggression, together with social factors.

1.2. Identity bubbles as a social risk and belonging to offline networks as a social protective factor

One of the unique characteristics of cyberspace is an easy access to like-minded social cliques, including individuals and groups who share ideas and behaviors that differ from the mainstream social values (Wojcieszak, 2010). There are specific filtering and personalization technologies online that facilitate users' exposure to certain content and contacts related to their ideas and behaviors. At the same time, it is more difficult to access opposite views. These personalization technologies are used, for example, on the social networking sites or search engines where exposure to content based on users' past online activity and preferences can increase user satisfaction (Liang et al., 2006; Pariser, 2011).

An emerging research line focuses on so-called "identity bubbles", defined as limited diversity of social contacts and information exposure online based on algorithmic filtering technologies, as well as interaction with like-minded people online (Kaakinen et al., 2020). According to the identity bubble reinforcement model proposed by Keipi, Näsi, Oksanen, and Räsänen (2017), people tend to validate their identity by identifying themselves with social media groups, interacting with like-minded individuals and groups online, and relying on the information provided by these groups or individuals. Thus, identity bubbles are formed through a complex process with interaction among individual and social factors together with unique features of cyberspace.

Although research on identity bubbles is still in its early stages, there are several promising findings regarding the relation between the identity bubble involvement and problem behaviors online. Using a sample of demographically balanced Finnish young people aged 15 to 25, a sample recruited from Finnish discussion forums and social media sites and a sample of 18- to 25- years old Mechanical Turk respondents from the US, Kaakinen et al. (2020) found that being a part of an identity bubble is related to compulsive Internet use. Kaakinen and colleagues (2018) found that belonging and trust in online community was related to high production of cyberhate in a sample of

over 3,500 Finnish, German, US and UK young people. Using a random sample of 15- to 25- years old US participants, Costello and Hawdon (2018) found that having strong bonds to online community was related to high cyberhate production. Despite a line of promising research, the relation between the identity bubble involvement and cyberaggression still needs more thorough investigation.

Previous research found a relation between identity bubble involvement and compulsive Internet use (Kaakinen et al., 2020) and also between compulsive Internet use and cyberaggression (Floros et al., 2013; Gamez-Guadix et al., 2016). Then, it is possible that the relation between online identity bubble involvement and cyberaggression is partly mediated via compulsive Internet use. Social norms such as observed increase in peers' activity within online communities tend to encourage responsive and even obligatory communication activity (Turel and Osatuyi, 2017). People who become involved in identity bubbles and therefore form strong bonds with an online community are more susceptible to these norms and peer influence. In turn, the susceptibility can be a basis for a compulsive Internet use (Kaakinen et al., 2020; Mottram and Fleming, 2009; Turel and Osatuyi, 2017). Further, this uncontrolled and burdening use of the Internet makes aggressive online behavior more likely to occur (Zych et al., 2019b).

At the same time, people's offline relationships may influence their identity bubble involvement and subsequent online behaviors such as compulsive Internet use and cyberaggression. A study with adults from the United States and The United Arab Emirates showed that preference for social interaction online was strongly related to compulsive Internet use (Quinones and Kakabadse, 2015). Mottram and Fleming (2009) also found that problematic Internet use was predicted by impulsivity and online group membership. However, the relation between identity bubble involvement and cyberaggression mediated by compulsive Internet use still needs to be explored.

It is possible that people involved in identity bubbles, with strong social bonds to the online community, become compulsive Internet users and, at the same time, have weaker bonds to offline

networks, but research findings on this topic are inconsistent. On the one hand, several studies suggested that strong social bonds with family, friends, schools, and work can be a protective factor against aggressive behavior online such as cyberbullying (see a systematic review of meta-analyses by Zych et al., 2019b). On the other hand, a study with a cross-national sample of over 3,500 15- to 30 years old American, Finnish, German and British young people found that offline belonging did not predict online hate production, although trust in people offline did predict cyberhate perpetration (Kaakinen et al., 2018). Thus, it is still necessary to confirm if social bonds offline can be a protective factor against cyberaggression.

1.3. The current study conducted from a cross-national perspective

Cross-national studies are especially useful to discover if certain risk and protective factors can be generalizable across contexts and cultures. Such examination is especially important because cyberaggression is a global phenomenon with no boundaries among different countries or cultures. There are reasons to believe that different countries may differ in the production of cyberaggression and its risk and protective factors. For example, some cultures are known to be collectivistic or individualistic (Markus and Kitayama, 1991) and it is possible that social factors such as involvement in identity bubbles and social bonding are stronger predictors of cyberaggression in collectivistic cultures than in individualistic counterparts. Previous research found that individualism was related to more cyberaggression, whereas collectivism was related to less cyberaggression (Wright et al., 2015). According to Hofstede's index (<https://www.hofstede-insights.com/>), South Korea is a collectivistic country, the US is an individualistic country, whereas Spain and Finland are two European countries with a medium level of individualism/collectivism, but located in two different geographic areas of Europe, south and north. According to Inglehart and Welzel (2005), the four studied countries belong to four different cultures including Confucian (South Korea), Protestant Europe (Finland), Catholic Europe (Spain), and English speaking (the US). Thus, a comparison of

these culturally and geographically different countries can be especially interesting to discover if predictors of cyberaggression are generalizable across contexts.

There are also different legislations that influence cyberaggression with more “Freedom of Speech” in the US and more limitations in Europe (Hawdon et al., 2017). Cross-national differences were also found to be important in related fields. For example, it was shown that certain intervention components of anti-bullying interventions can be effective in some countries, but are not effective in other countries (Gaffney et al., 2019). Thus, the current study was conducted in four countries located in different geographic areas and cultures including Finland, South Korea, Spain and the US.

Although research on certain types of cyberaggression has been very fruitful, there are still several gaps in knowledge that need to be addressed. Among them, cross-cultural comparative studies are urgently needed to understand generalizability and specificity of certain risk and protective factors. Moreover, dynamic relations among individual factors such as impulsivity and compulsive Internet use, and social factors such as identity bubble involvement and social bonding offline have not been thoroughly studied yet.

Studying dynamic relations among individual and social predictors of cyberaggression can be especially useful because tailored interventions could be designed to decrease risks and increase protective factors. Including individual and social factors in the same project is especially useful because aggressive behavior online is known to be determined by personal and interpersonal factors (Baldry et al., 2015). Studying young people is also important because prevention could be improved if these factors are present before young people get involved in cyberaggression. Studying the role of impulsivity is important because it is one of the strongest predictors of antisocial behavior (Gottfredson and Hirschi, 1990; Pratt and Cullen, 2000; Vazsonyi et al., 2017), but the number of studies focused on impulsivity and cyberaggression is still low. Compulsive Internet use is one of the strongest risk factors for cyberaggression (Zych et al., 2019b) and it is important to discover if it acts as a mediator of the relations between different predictors and cyberaggression. Regarding social

factors, identity bubble involvement is a variable specifically focused on cyberspace and with a great explanatory potential, but this is a newly described construct (Keipi et al., 2017) that still needs to be thoroughly studied. Whereas social bonds online can be a risk factor, social bonds offline are an important protective factor (Zych et al., 2019b). Thus, the current study includes a combination of risk and protective factors with a great explanatory potential that have not been studied yet.

Impulsivity is related to antisocial behavior (Gottfredson & Hirschi, 1990), compulsive Internet use is a risk factor for some types of cyberaggression (Zych et al., 2019b), identity bubble involvement is associated with a problem behavior (Keipi et al., 2017) and offline bonds are a protective factor against aggression online (Zych et al., 2019). Thus, we hypothesize that impulsivity, compulsive Internet use and involvement in identity bubbles are risk factors and sense of belonging offline is a protective factor against cyberaggression (hypothesis 1). Identity bubble involvement (Kaakinen et al., 2020) and impulsivity (Hong et al., 2014) are related to compulsive Internet use which in turn is related to aggressive behavior online (Zych et al., 2019b). Thus, it is hypothesized that the relation between identity bubble involvement and cyberaggression, and the relation between impulsivity and cyberaggression are mediated by compulsive Internet use (hypothesis 2). It is also hypothesized that the highest rates of cyberaggression are found in the US where the legislative limitations are the weakest (Hawdon et al., 2017), and the strongest relation between social factors and cyberaggression are found in South Korea that is the most collectivistic country studied (hypothesis 3). A theoretical model tested in this study is shown in Figure 1.

Insert Figure 1

2. Methods

2.1. Participants

This study was conducted with a cross-national survey collected among 4,816 15 – 25-year-old participants (49.83% female, $M_{age} = 20.50$, $SD = 3.16$) in Finland ($n = 1,200$, 50% female, $M_{age} = 21.29$, $SD = 2.85$; collected in March-April 2017), South Korea ($n = 1,192$, 50.42% female, $M_{age} = 20.61$, $SD = 3.24$; collected in February 2018), Spain ($n = 1,212$, 48.76% female $M_{age} = 20.07$, $SD = 3.16$; collected in January 2019), and the US ($n = 1,212$, 50.17% female, $M_{age} = 20.05$, $SD = 3.19$; collected in January 2018). The data were stratified in each country and were demographically balanced for age, gender, and geographical location.

2.2.Procedure

Data were collected through online surveys conducted in each country. The cross-sectional survey was designed in English and Finnish and it was translated into South Korean and Spanish by Korean and Spanish native speakers proficient in English, respectively. Surveys were back-translated by independent native speakers and any discrepancies were resolved.

Surveys were administered by the research group and collected using research panel of Dynata (formerly known as Survey Sampling International) who used a volunteer participant panel. Dynata recruits panel members from multiple sources. Non-probabilistic sampling methods were used but the samples were ensured to mirror the population (see Oksanen et al., 2018). The principal investigator's institutional ethics committee evaluated the project and stated that it did not include any ethical problems. The project adhered to all the international and national research standards. Participants were provided with informed consents that included information about the study. Participation was voluntary and anonymous. Dynata does not directly reward participants by financial rewards, but they give some of their participants points that can be exchanged for cash or vouchers. Surveys were completed by the participants in around 15 minutes.

2.3.Instruments

Cyberaggression was measured with an item “How often do you send messages in social media that offend or threaten other users?” This item was answered on an eight-point Likert scale ranging from 0 (*never*) to 7 (*daily*).

Impulsivity was measured through the Eysenck Impulsivity Scale (Eysenck and Eysenck, 1977) that consisted of five items answered on a dichotomous yes/no scale. Items focused on behaving impulsively and without thinking. As the scale consists of binary variables the reliability of the scale was assessed using tetrachoric alpha. The scale showed adequate tetrachoric ordinal alpha coefficients in the current sample ($\alpha = .87$ in Finland, $\alpha = .77$ in South Korea $\alpha = .80$ in Spain, and $\alpha = .81$ in the US).

Compulsive Internet Use was measured with the Compulsive Internet Use scale (Meerkerk et al., 2009) that included 14 items answered on a five-point Likert scale ranging from 0 (*never*) to 4 (*very often*). Compulsive Internet Use scale is one of the most popular scales used to measure this problem behavior with items developed based on the criteria of behavioral addictions, dependence and pathological gambling, including withdrawal symptoms, loss of control, preoccupation, conflict, coping and lying to hide Internet use (Meerkerk et al, 2009). This scale had an excellent reliability in the current sample ($\alpha = .94$ in Finland, $\alpha = .94$ in South Korea, $\alpha = .93$ in Spain, and $\alpha = .95$ in the US).

Identity Bubble Reinforcement scale (IBRS-6, Kaakinen et al., 2020) was used to measure involvement in online identity bubbles. The scale included six items responded on a 10-point Likert scale ranging from 1 (*does not describe me at all*) to 10 (*describes me completely*). Items focused on belonging to an online community, preference to interact online with like-minded people and trust in information shared on social media. This scale showed very good reliability in the current sample ($\alpha = .80$ in Finland, $\alpha = .93$ in South Korea, $\alpha = .86$ in Spain, and $\alpha = .90$ in the US).

Sense of belonging to offline networks was measured by asking the participants “How strongly do you feel you belong to “family,” “friendship group,” and “school or work community”.

These three items were responded on a 10-point Likert scale ranging from 1 (*not at all*) to 10 (*very strongly*). Reliability coefficients of this scale were good ($\alpha = .76$ in Finland, $\alpha = .81$ in South Korea, $\alpha = .76$ in Spain, and $\alpha = .82$ in the US).

2.4. Data analysis

Total scores in each scale were computed for all the analyses. Descriptive results such as means and standard deviations for the continuous variables and percentages for the categorical variables were calculated for each country.

Logistic regression analyses were performed to discover the relations between the hypothesized risk and protective factors and cyberaggression. Responses to the cyberaggression item were dichotomized into 0 (never offended) versus 1 (has offended at least once), as responses to cyberaggression item were skewed and authors wanted to discover the differences between offenders and non-offenders. Mediation was tested through the decomposition analysis using the Karlson–Holm–Breen (KHB)-Method. This method was chosen because it is adequate for testing linear and non-linear relations among variables, continuous and categorical variables, testing if a variable mediates the relation between another variable and a latent outcome (Kohler, Karlson, & Holm, 2011). Additional interaction analyses were conducted to test whether there were country differences in the relationships between cyberaggression and impulsivity, compulsive Internet use, identity bubble involvement, and belonging offline. These analyses were performed in Stata 15.1.

3. Results

Descriptive statistics for all the study variables are shown in Table 1. Cyberaggression is present and prevalent across the studied countries, with the highest prevalence rates in the US, followed by Spain, South Korea and Finland (see Table 1 for more details).

Insert table 1

Logistic regression analyses showed that all the hypothesized risk and protective factors were related to *Cyberaggression* in the expected direction (see Table 2). Regarding the individual factors, high *Impulsivity* was related to high *Cyberaggression* in all the studied countries, with the strongest relation in South Korea (OR = 1.26, $p < .001$) and the weakest relation in the US (OR = 1.12, $p = .005$) and Spain (OR = 1.11, $p = .010$). According to our additional country interaction analysis (not reported in tables), there was a significant difference in the association only between South Korea (the reference category) and Spain (OR = 0.88, $p = .031$). The relation between *Compulsive Internet use* was significant in Finland, Spain and the US, with the strongest relation in Finland (OR = 1.04, $p < .001$) and it was non-significant in South Korea (OR = 1.01, $p = .224$). According to our interaction analysis, the association differed significantly between Finland (the reference category) and South Korea (OR = 0.98, $p = .050$).

Regarding the social factors, involvement in the *Identity bubbles* was related to high *Cyberaggression* in all the studied countries, with the strongest relation in South Korea (OR = 1.05, $p < .001$) and the weakest relation in Finland (OR = 1.02, $p = .017$). The difference in the association was significant only between South Korea (the reference category) and Finland (OR = 0.98, $p = .019$). A high *Sense of belonging* offline was related to less *Cyberaggression*, with the strongest relation in South Korea (OR = 0.93, $p < .001$) and the weakest relation in the US (OR = 0.98, $p = .020$). There were no statistically significant country differences in the association between *Sense of belonging* offline and *Cyberaggression*.

Insert table 2

Table 3 shows mediation analyses testing if *Compulsive Internet use* was a mediator of the relation between *Impulsivity* and *Cyberaggression*, and involvement in *Identity bubbles* and *Cyberaggression*. Based on the effect of the reduced model (total effect that includes the sum of direct and indirect effects), high *Impulsivity* increased *Cyberaggression* in all four countries by 0.17 (the US) to 0.27 (South Korea). Controlling for *Compulsive Internet use*, the effect of *Impulsivity* reduced to 0.12 in Spain and in the US, and to 0.19 in Finland (but did not reduce in South Korea), leaving indirect effects of 0.03 (Finland), 0.05 (the US) and 0.06 (Spain). Thus, *Compulsive Internet use* mediates the relation between *Impulsivity* and *Cyberaggression* in Finland, Spain and the US, but not in South Korea. Given that the direct effect of *Impulsivity* on *Cyberaggression* remains significant in Finland, Spain and the US after introducing the mediator, *Compulsive Internet use* partially mediates the relation between *Impulsivity* and *Cyberaggression*.

Based on the total effect, high involvement in *Identity bubbles* increased *Cyberaggression* in all four countries by 0.03 (Finland) to 0.05 (South Korea and Spain). Controlling for *Compulsive Internet use*, the effect of involvement in *Identity bubbles* only slightly reduced from 0.02 (Finland) to 0.05 (South Korea), leaving the only statistically significant indirect effect of 0.02 in Spain. Given that the direct effect remained significant, *Compulsive Internet use* partially mediated the relation between involvement in *Identity Bubbles* and *Cyberaggression* in Spain and did not mediate this relation in Finland, South Korea and the US.

Insert table 3

4. Discussion

Although cyberaggression is a relatively new phenomenon (Smith and Berkkun, 2017; Zych et al., 2015), research on certain types of cyberaggression is well developed. Nevertheless, most of the previous studies focused on specific types of cyberaggression and it has rarely been approached

from a broad perspective. Moreover, cross-national studies focusing on direct and indirect relations among individual and social risk and protective factors are still needed to understand the generalizability of factors related to cyberaggression and to design tailored interventions to reduce it.

The current study showed that cyberaggression prevalence rates vary greatly among the studied countries. As expected, the highest rates were found in the US, a country with more “Freedom of Speech” and less limitations regarding aggressive speech offline and online (Hawdon et al., 2017). Finland was the country with the lowest prevalence rates of cyberaggression, but it was still reported by over one out of five participants. Thus, a global effort to reduce cyberaggression is urgently needed among different stakeholders such as researchers, educators, and policy makers and especially in the geographic areas with the weakest legislative limitations.

Impulsivity has been found to be a robust risk factor for different types of antisocial behavior (Farrington et al., 2015), but its relation to cyberaggression has not yet been thoroughly studied. Our results showed that impulsivity was positively related to cyberaggression in all the studied countries. This relation was stronger in South Korea in comparison to Spain. Studies have consistently found that young people who score high on impulsivity in South Korea tend to engage in online misbehavior such as cyberbullying (Nam & Kweon, 2013). Compared to those in Spain, extremely competitive social environments toward success in going to a top university and having a high-status job, tend to suppress South Korean youths, yet their impulsive nature of adolescence could be expressed through cyberaggression. However, the national differences in impulsivity-online aggression relationship still require further inquiry.

We also found that compulsive Internet use was significantly and positively related to cyberaggression in Finland, Spain and the US, but not in South Korea. This relation was stronger in Finland in comparison to South Korea. Moreover, the relation between impulsivity and cyberaggression was mediated by compulsive Internet use in Finland, Spain and the US, but not in South Korea. According to our results, those individuals with high impulsivity tend to use the Internet

more compulsively, which in turn increases aggression online. In South Korea, however, the aggressive online behavior was driven solely by impulsivity. It is possible that young compulsive Internet users in South Korea differ from those in other countries in terms of usage patterns. This is also in line with our finding that the amount of compulsive Internet use was highest in South Korea. A more or less compulsive Internet use is an individual-level regulation strategy, which might work well especially in impulsive individuals from more individualistic countries. It is also possible that aggression is perceived differently depending on the culture of each country. Future longitudinal or experimental studies could confirm this possibility.

Regarding social factors, involvement in identity bubbles was positively related to cyberaggression, and sense of belonging offline was negatively related to cyberaggression in all the studied countries. Also as expected, the relation was significantly stronger in South Korea in comparison to Finland. This finding may be explained by some cultural differences such as individualism and collectivism as people in more collectivistic culture like South Korea are more tuned to sense of belonging in their social relationships (Markus & Kitayama, 1991).

Our findings also seem consistent with previous research that found the relation between individualism/collectivism and cyberaggression, where individualism related to more cyberaggression and collectivism was related to less cyberaggression (Wright et al., 2015). Contrary to our expectations, however, the relation between involvement in identity bubbles and cyberaggression was mediated by compulsive Internet use only in Spain. Thus, the robust relationship between involvement in identity bubbles and cyberaggression seems mainly credited to how people relate to groups and information online, not the compulsive use of the Internet per se. Internet cliques frequently share ideas and behaviors that differ from the mainstream values (Wojcieszak, 2010). Then, it is possible that individuals normalize these behaviors and become aggressive online regardless of using the Internet in a more compulsive or controlled way. While the current study did not focus on

the content of these identity bubbles, future studies should check if this effect is stronger in cliques that produce more aggression.

This study has some important strengths such as the use of a demographically balanced sample of over 4,800 young people from four geographically and culturally diverse countries. The study included both individual and social, as well as risk and protective factors, testing dynamic relations among these variables and cyberaggression approached from a broad perspective. Nevertheless, it also has some limitations. First, this study used self-reports only and future research could use also content monitoring tools that could reveal cyberaggression rates in real-life situations. Second, although our models were strongly theory-based, causal relations and even the temporal order of the phenomena need to be confirmed through longitudinal and experimental studies.

Most projects in the field use cross-sectional data to study risk and protective factors, and more longitudinal research is needed to disentangle predictors from correlates, and consequences, ideally distinguishing between direct and buffering risk and protective factors (see Zych et al., 2019a for further discussion). Future studies could also focus on differences in risk and protective factors for cyberaggression perpetrated through different platforms, forums or social networking sites. More countries could be involved for research, in order to test the generalizability of the findings across different geographic, cultural, socioeconomic, and legislative characteristics. Having measured cyberaggression with one item that focused on sending messages in social media that offend or threaten other users is another limitation of this study. Nevertheless, one-item measures are common in the field (Smahel et al., 2020; Zych et al., 2016) and this type of aggressive communication item is efficient in identifying a prevalent form of cyberaggression. Thus, results are comparable to those obtained in other projects focused on different forms of cyberaggression. Future studies should confirm our results by measuring also other types of cyberaggression.

Even with some limitations, our findings have some important implications for policy and practice. Given that cyberaggression is present and prevalent across the studied countries,

intervention programs need to be urgently implemented. Meta-analytic findings showed that there are several effective programs against cyberbullying, but there is still room for improvement in their effectiveness (see Gaffney et al., Ttofi, 2019). Based on our findings, interventions should include components that decrease compulsive Internet use and promote strategies to control impulsive behavior. Belonging to offline communities should be promoted, and specific strategies to reduce involvement in identity bubbles should be implemented.

Our study found that cyberaggression is present across geographic areas and cultures. Thus, it could be useful to design and implement cross-national interventions to decrease it. These cross-national or even global interventions could focus on some changes in ways that the content filters limit information based on individual's previous activities to create identity bubbles. Exposing Internet users to more diverse content and social contacts could be beneficial. Internet platforms should also promote reflexive, rather than impulsive behaviors, for example, by giving users the possibility to eliminate or edit their messages and to flag inappropriate messages. Online communities' clear rules and guidelines for acceptable behavior would help detect and regulate inappropriate content, and repeated rule violations could be punished. Promoting protective factors and decreasing risks of cyberaggression through education is also important. It could be especially useful to develop comprehensive intervention programs that focus on critical thinking, decrease impulsivity and problematic Internet use, promote face-to-face interactions and raise awareness about identity bubbles. The current study advances knowledge on an important topic, opens up new research horizons and has important implications for policy and practice.

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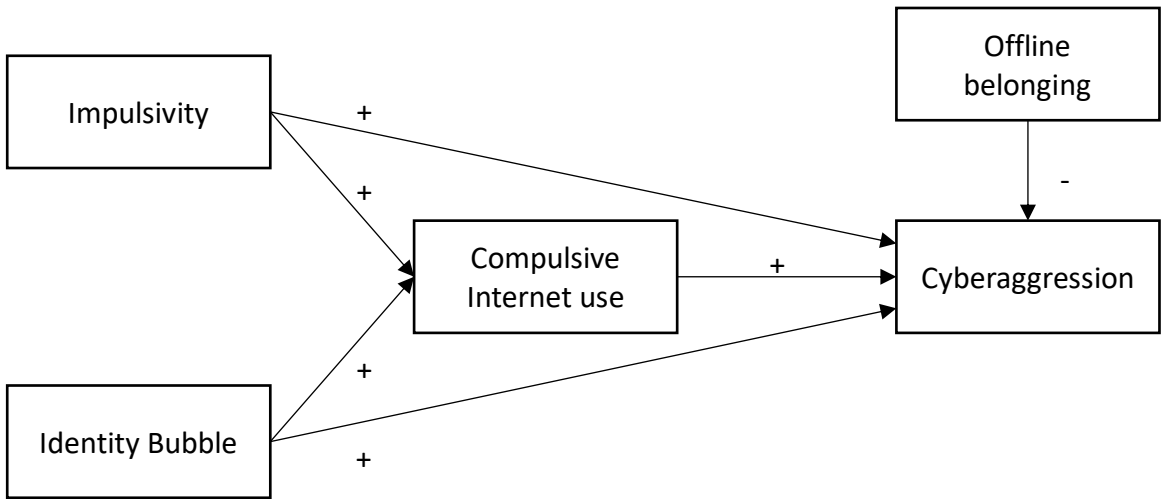


Figure 1. A theoretical model tested in the current study

Table 1. Descriptive statistics of the study variables

		<i>Finland</i>		<i>South Korea</i>		<i>Spain</i>		<i>The US</i>	
<i>Continuous variables</i>	<i>Range</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Impulsivity	0-5	2.3	1.4	2.6	1.5	3.1	1.6	2.9	1.6
Identity Bubble	6-60	27.8	10.0	31.6	11.4	34.5	11.6	35.7	12.6
Compulsive Internet use	0-56	18.8	11.1	23.1	12.8	22.2	12.7	21.7	13.5
Belonging offline	3-30	20.2	6.1	20.1	5.9	21.3	5.8	20.3	6.7
Age	15-25	21.3	2.8	20.6	3.2	20.1	3.2	20.1	3.2
<i>Categorical variables</i>	<i>Coding</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Cyberaggression	0=no, 1=yes	264	22.0	342	28.7	507	41.8	568	46.9
Gender (female)	0=no, 1=yes	600	50.0	601	50.4	591	48.8	608	50.2

Table 2. Logistic regression analysis including Impulsivity, Compulsive Internet use, Identity Bubble involvement, and Belonging offline, Age and Gender as predictors of Cyberaggression

	<i>Finland</i>			<i>South Korea</i>			<i>Spain</i>			<i>The US</i>		
	<i>OR</i>	<i>SE</i>	<i>P</i>	<i>OR</i>	<i>SE</i>	<i>P</i>	<i>OR</i>	<i>SE</i>	<i>p</i>	<i>OR</i>	<i>SE</i>	<i>p</i>
Female	0.24	0.04	.000	0.50	0.07	.000	0.45	0.06	.000	0.53	0.07	.000
Age	0.93	0.02	.009	0.93	0.02	.001	1.12	0.02	.000	1.07	0.02	.000
Impulsivity	1.19	0.07	.002	1.26	0.06	.000	1.11	0.05	.010	1.12	0.04	.000
Compulsive Internet use	1.04	0.01	.000	1.01	0.01	.224	1.03	0.01	.000	1.03	0.01	.000
Identity Bubble	1.02	0.01	.017	1.05	0.01	.000	1.03	0.01	.000	1.03	0.01	.000
Belonging offline	0.94	0.01	.000	0.93	0.01	.000	0.96	0.01	.000	0.98	0.01	.002
Constant	6.10	4.52	.015	2.01	1.29	.275	0.07	0.04	.000	0.16	0.08	.000
Cragg & Uhler's R ²			.20			.17			.21			.14

Table 3. A decomposition analysis testing the relation between Impulsivity and Cyberaggression, and involvement in Identity Bubbles and Cyberaggression, mediated by Compulsive Internet Use

	<i>Finland</i>			<i>South Korea</i>			<i>Spain</i>			<i>The US</i>		
	<i>OR</i>	<i>SE</i>	<i>P</i>	<i>OR</i>	<i>SE</i>	<i>p</i>	<i>OR</i>	<i>SE</i>	<i>p</i>	<i>OR</i>	<i>SE</i>	<i>p</i>
Impulsivity												
Reduced (total)	1.22	0.07	.000	1.27	0.06	.000	1.18	0.05	.000	1.17	0.05	.000
Full (direct)	1.19	0.07	.002	1.26	0.06	.000	1.11	0.05	.010	1.12	0.04	.005
Difference (indirect)	1.03	0.01	.004	1.01	0.01	.241	1.06	0.01	.000	1.05	0.01	.000
Identity bubble												
Reduced (total)	1.03	0.01	.000	1.05	0.01	.000	1.05	0.01	.000	1.04	0.01	.000
Full (direct)	1.02	0.01	.017	1.05	0.01	.000	1.03	0.01	.000	1.03	0.01	.000
Difference (indirect)	1.01	0.01	.177	1.00	0.00	.326	1.02	0.01	.047	1.01	0.01	.078